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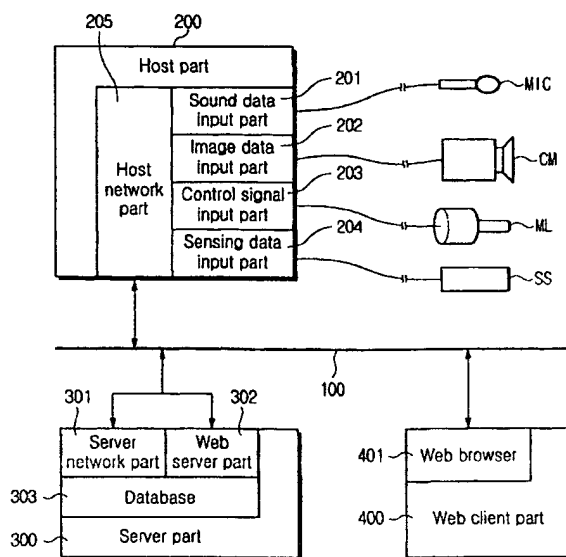
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(54) Title: SYSTEM AND METHOD FOR REMOTE CONTROL AND MONITORING USING INTERNET



(57) Abstract: The present invention relates to a remote control and a monitoring system using an Internet, which includes a host part installed on a position wherein a controlled object is located for inputting an image data, a sound data and a sensing data to output a control signal, a server part for storing the image data, the sound data and the sensing data received from the host part and transmitting the stored control signal to the host part, and a web client part for receiving the image data, the sound data and the sensing data stored in the server part in a programmed form, displaying thereof by a web browser, and transmitting the control signal to the server part.



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## SYSTEM AND METHOD FOR REMOTE CONTROL AND MONITORING USING INTERNET

### Technical Field

The present invention relates to remote control and monitoring system and  
5 method using the Internet, and more particularly, to remote control and monitoring  
system and method for performing home automation, factory automation, safety  
monitoring and remote control using the Internet

### Background Art

10 Recently, Internet web sites increasing in geometrical progression have been  
widely used covering the whole field of industry. For instance, these web sites provide  
images, etc., from a remote place using a web client connected to the Internet. Using  
such the method, these web sites are also being applied to video conference or video  
chatting which is one kind of on-line bi-directional communications between remote  
15 places.

In the meanwhile, there is being developed a system for controlling home  
electronics established in a house on virtual reality. The system includes devices for  
performing operation or temperature setting in an air conditioner, reserved recording in  
a video cassette recorder (VCR), lighting control, crime prevention, and protection  
20 against disasters. The devices of such the system receive and transfer remote image,  
control signal and sensing signal by executing a dedicated Internet programming  
without using a web browser.

Then, such the remote control system has problems in that the devices are too

high in price, a separate client should be used or a dedicated program should be installed.

### **Disclosure of the Invention**

5           Therefore, it is an object of the invention is to resolve the above problem and to monitor sound, image and control signal by receiving sound data, image data and sensing data in relation to a control object connected through the Internet using a web browser of a web client.

          It is another object of the invention is to transmit a control command through a  
10 web browser of a web client and thereby remotely and electrically control a control object.

          Other objects and features of the present invention will become apparent from the following detailed description considered in connection with the accompanying drawings that disclose an embodiment of the present invention.

15           To accomplish the above objects and advantages, there is provided a remote control and monitoring system using the Internet. The system comprises: a host part installed at a place where a control object is positioned, for receiving image data, sound data and sensing data and outputting a control signal; a server part for storing the image data, sound data and sensing data received from the host part and transmitting the stored  
20 control signal to the host part; and a web client part for receiving the image data, sound data and sensing data in a programmed form, displaying the received image data, sound data and sensing data through a web browser and transmitting the control signal to the server part.

          According to another aspect of the invention, there is provided a remote control

and monitoring method using the Internet. The method comprises the steps of: setting a client homepage and a database record and determining whether or not a service is requested from the host part; determining whether or not a flag of a database of the server part has a specific value if a service is requested from the host part; transmitting a  
5 service start signal to a host network part of the host part if the flag has the specific value; receiving the image data, sound data and sensing data from the host network part of the host part and recording the received data in a record of the database of the server part; displaying the homepage of the client depending on a request of the web client and displaying the stored image data, sound data and sensing data on the homepage; and  
10 determining whether or not to initialize the flag of the database, if the flag is not initialized, repeating the recording, displaying and transmitting steps while if the flag is initialized, requesting an ending of the service.

### **Brief Description of the Drawings**

15 FIG. 1 is a block diagram for describing the concept of a remote control and monitoring system using the Internet in accordance with one preferred embodiment of the present invention;

FIG. 2 is a block diagram for specifically describing the remote control and monitoring system using the Internet in accordance with one preferred embodiment of  
20 the present invention;

FIG. 3 is a data flowchart for describing a process to realize a remote control and monitoring method using the Internet in accordance with one preferred embodiment of the present invention;

FIG. 4 is a flowchart for describing data transmission and receipt between a

server network part and a host network part;

FIG. 5 is a flowchart for describing functions of a host part centering on the host network part;

FIG. 6 is a flowchart for describing operation of a web server part in the system  
5 of FIG. 1; and

Fig. 7 is one example of a web page displayed through a web browser of the web client in the remote control and monitoring system using the Internet in accordance with the present invention.

#### 10 **Best Mode for Carrying Out the Invention**

Now, preferred embodiments of the present invention will be described in detail with reference to the accompanying drawings. In reference numeral assigned to elements of respective drawings, it is noted that like elements are denoted by like reference numerals if possible although they are shown in different drawings.

15 FIG. 1 is a block diagram for describing the concept of a remote control and monitoring system using the Internet in accordance with one preferred embodiment of the present invention.

Referring to FIG. 1, a remote control and monitoring system of the present invention includes hosts 210 and 220 established at places where control objects are  
20 disposed, a server part 300 connected through the Internet 100 and web clients 410 and 420. Position information, address information and the like on the Internet are registered in the server part 300 in advance.

Hosts 210 and 220 are established at home, factory, office, etc., for example and they receive image data, sound data and sensing data all of which are related to a control

object or transmit a control signal to the control object. Web clients 410 and 420 are connected to the server part 300 through the Internet 100. Each of the hosts 410 and 420 is programmed and connected in accordance with a socket manner of TCP/IP (Transmission control protocol/Internet protocol).

5        FIG. 2 is a block diagram for specifically describing the remote control and monitoring system using the Internet in accordance with one preferred embodiment of the present invention.

Referring to FIG. 2, host part 200 includes a sound data input part 201, an image data input part 202, a control signal output part 203, a sensing data input part and a host  
10    network part 205.

The sound data input part 201 is connected to, for example, a microphone (MIC), the image data input part 202 is connected to an image input camera (CM), the control signal output part 203 is connected to a driving means (ML) such as a motor, a relay, etc., and the sensing data input part 204 is connected to a sensor (SS) such as an optical  
15    sensor, a temperature sensor, a displacement sensor, etc.

The sound data input part 201 functions to transmit an onsite circumstance of a control object to a remote place in sound and it includes a sound card and a driver. The image data input part 202 receives and processes an image data of current state of a object for the control or observation. The image data is input through the image input  
20    camera (CM). In case that a USB (Universal serial bus) is used, the image input camera (CM) is connected through a USB port. And, in case that a television image standard, for example, NTSC is used, a separate image input board is installed.

The control signal output part 203 moves a motor or drives a relay depending on information received from the server part 300. The control signal output part 203 is

connected to a controller of a high performance apparatus such as a robot as well as the motor or relay, so that it becomes possible to control such the elements using the web browser 401 of the web client part 400 positioned at a remote place.

The sensing data input part 204 receives a state data of a control object sensed  
5 by sensors and transfers the received state data to the server part 300.

The host network part 205 communicates with the server network part 301 of the server part to receive and transmit a variety of data from and to the server network part 301. In other words, the host network part 205 transmits sound data obtained by the sound data input part 201, image data obtained by the image data input part 202 and  
10 sensing data obtained by the sensing data input part 204 and receives control signal output from the server part 300.

In the meanwhile, the server part 300 further includes a database (hereinafter referred to as "DB") 303 functioning to store and relay the sound data, image data and control command.

15 The server network part 301 of the server part 300 transmits and receives data to and from the host part 200. Specifically, the server network part 301 receives sound data obtained by the sound data input part, image data obtained by the image data input part 202 and sensing data obtained by the sensing data input part 204, and transmits to the host 200 control signal for driving and controlling motor, relay, etc.

20 The web server part 302 is built to allow a client to see the state of a control object through the web browser 401 of the web client part 400. The web server part 302 can use a language such as HTML (HyperText Markup Language) 302a file or JAVA language and is fabricated using a CGI (Common Gateway Interface) 302b, java applet, etc. In case of using wireless Internet, WAP (Wireless Application Protocol)-based



WML (Wireless Markup Language), etc., can be used instead of the HTML file. At this time, CGI functions to read and write records of DB 303.

The web server part 302 functions to allow displaying an image, output a sound and displaying the state of sensed information received upon opening the HTML file of the web server part 302 using the web browser 401 of the web client part 400 based on  
5 sound data, image data and sensing data all of which are received by the server network part 301.

In addition, when clicking a button for controlling a control object on the web browser 401, the CGI 302b perceives the clicking and functions to store it in a record  
10 form in the DB 303.

In terms of a processor, the server part 303 is operated by two processors corresponding to the server network part 301 and the web server part 302, respectively. If necessary, the two processors can be integrated into a single processor and they share the DB 303.

15 The web client part 400 indicates a personal computer or workstation in which the web browser 401 is installed. The web server part 400 receives image data, sound data and sensing data of a corresponding onsite and shows picture and sound, or a check button for confirming a sensing state when a user opens a corresponding HTML file 302a through the web server part 302 of the server part 300. In addition, the web client  
20 part 400 provides an interface environment allowing a user to click a control button for the remote control of a control object. Accordingly, due to the characteristic of the web browser 401, wherever such the computers are placed, the computers can observe picture, hear sound of a current state, check sensing state and transmit a control signal for the remote control.

FIG. 3 is a data flow chart for describing a process for realizing a remote control and monitoring method in accordance with one preferred embodiment of the present invention and FIG. 4 is a flow chart for describing data transmission and receipt between the server network part and the host network part.

5 In FIGS. 3 and 4, the DB 303 of the server part 300 stores records for inputting and outputting information related to clients who need services. The records are meant by sound data, image data, sensing data, control signal and flag values dealt by the host part 200. Flag is a signal used for transmitting and receiving information between respective elements. The server network part 301 and the web server part 302 can  
10 transmit and receive information to and from the DB. Record of the DB 303 in an initial state is "0".

The server part 300 designates client homepage and records of the DB 303 so that it can transmit and receive information of client to and from a client who needs information related to a client (Step 100).

15 In the step 100, as the client homepage and the DB record 303 are designated, it is determined whether or not to request a service that the host network part 205 of the host part 200 are operated (Step 101). If the service is not requested, the step 101 is repeated until the service is requested.

In step 101, if the service is requested, the server network part 301 of the server  
20 part 300 sets respective records of the DB 303 as "0" to thereby request a service of the web client part 400 and complete the initializing procedure.

As aforementioned, if the web browser 401 of the web client part 400 in a remote place calls the HTML file 302a which has been installed in the web server part 302 of the server part 300, a homepage is displayed. The HTML file 302a receives

image data, sound data and sensing data of a corresponding onsite and shows image and sound or shows the check button for confirming a sensing state. Also, the HTML file 302a provides a control button to transmit a control signal for remotely controlling a control object.

5        If the service is requested in the step 101, it is determined whether or not the flag of the DB 303 is set as "1" (Step 102). If the flag is not set as "1", the step 102 is repeated. In the step 102, if the flag of the DB 303 becomes "1" at the instant that the HTML file 302a is called, the server network part 301 perceives the conversion of the flag into "1" and transmits a start signal of the service to the host network part 205 (Step  
10   103).

In the step 103, if the start signal of the service is transmitted, the server network part 301 of the server part 300 receives image data, sound data and sensing data from the host network part 205 (Step 104), and records and stores the received image data, sound data and sensing data in the DB 303 (Step 105).

15        In step 104, the server network part 301 receives the image data, sound data and sensing data from the host network part 205 by a certain period. The period can be designated arbitrarily. It is allowed that the server network part 301 receives any one data, displays the received data on the homepage and receives next data or signal. In addition, it is allowed to make a difference in a time to transmit and receive the image  
20   data, sound data and sensing data.

In the meanwhile, when the start signal of the service is transmitted and the control button on the homepage of the web browser of the web client part 400 is clicked in the step 103, control signal records are read from the DB 303 (Step 106) and the read control signal is transmitted to the host network part 205 (S107).

After the Steps 105 and 107 are executed, it is determined whether or not the flag is "0" (Step 108). If the flag is not "0", it returns to the steps 104 and 106 respectively while if the flag is "0", it is determined whether or not to end the service (S109). If the ending of the service is not requested, it returns to the step 102. And if the  
5 ending of the service is requested, it returns to the step of 101.

FIG. 5 is a flow chart for describing a function of the host part centered at the host network part.

The host part 200 first requests a service to the server part 300 (Step 200). After that, it is determined whether or not the service start signal is input into the host network  
10 part 205 (Step 201). If the service start signal is input, the host network part 205 receives sound data, image data and sensing data from the sound data input part 201, image data input part 202 and sensing data input part 204, respectively (S202), and transmits the received sound data, image data and sensing data to the server network part 301 (Step 203).

15 Concurrently with this, if the service start signal is input in the step 201, the host network part 301 receives a control signal of a corresponding record stored in the DB 303 through the server network part 301 (Step 204), and transmits the received signal to the control signal output part 203 (Step 205). The control signal output part 203 outputs a driving signal of a motor or relay, etc., depending on the control signal transmitted  
20 from the host network part 205.

After the steps 203 and 205 are executed, it is determined whether or not to end the service (Step 206). If the service is not ended, it returns to the steps 202 and 204, respectively while if the service is ended, it ends the function of the host part 200.

FIG. 6 is a flow chart for describing functions of the web server part in the

remote control and monitoring system using the Internet shown in FIG. 1.

When the HTML file 302a installed in the web server part 302 is called through the web browser 401 of the web client part 400, the flag is set as "1" (Step 301).

If the flag is set as "1", the image data, sound data and sensing data are read  
5 from a corresponding record of the DB 303 (S302) and the read image data, sound data and sensing data are displayed on the homepage (Step 303).

In addition, If the flag is set as "1" in the step 301 and the control button on the homepage is clicked through the web browser 401 of the web client part 400, a control signal is recorded in a corresponding record of the DB 303 (Step 305).

10 After the steps 303 and 305 are executed, it is determined whether or not to end the homepage (Step 306). If the homepage is not ended, it returns to the steps 302 and 304 while if the homepage is ended, the flag is set as "0" (Step 307).

FIG. 7 is one example of a web page displayed through the web browser of the web client part in the remote control and monitoring system using the Internet in  
15 accordance with the present invention. Referring to FIG. 7, the web page of the remote place displays states of image data, sound data and sensing signal and can transmit a control command through the control button (Command) to the remote place.

While the present invention has been described in detail with reference to the preferred embodiments, those skilled in the art will appreciate that various  
20 modifications and substitutions can be made thereto without departing from the spirit and scope of the present invention as set forth in the appended claims.

As described above, the remote control and monitoring system in accordance with the present invention has the following advantages.

Since the remote control and observation are performed using web on the

Internet, it is possible to observe image and sound and sense control signal including a variety of signals regardless of positions without installing a specific program if a web browser has been installed in the computer.

In addition, since a host part is installed at home or factory of a client who needs  
5 the service and a server part connected to the respective host parts through the Internet manages image data, sound data and sensing data, it is possible to perform a state check of a control object and various controls from a remote place.

**Claims:**

1. system and method for remote control and monitoring using Internet,  
the system comprising:
    - 5 a host part installed at a place where a control object is positioned, for receiving image data, sound data and sensing data and outputting a control signal;
    - a server part for storing the image data, sound data and sensing data received from the host part and transmitting the stored control signal to the host part; and
    - a web client part for receiving the image data, sound data and sensing data in a  
10 programmed form, displaying the received image data, sound data and sensing data through a web browser and transmitting the control signal to the server part.
  2. The system of claim 1, wherein said host part comprises:
    - an image data input part connected to an image input device, for receiving the  
15 image data;
    - a sound data input part connected to a sound input device, for receiving the sound data;
    - a sensing data input part connected to a sensor, for receiving the sensing data;
    - a control signal output part for outputting a control signal received from the  
20 server part to a driving device; and
    - a host network part for transmitting or receiving the sound data, image data and sensing data and the control signal to or from the server part.
- wherein the background picture managing server further comprises:
- a homepage managing part which constructs a homepage and stores and

manages the constructed homepage at a homepage information DB; and

3. The system of claim 1, wherein said server part comprises
- a server network part for receiving the image data, sound data and sensing data
- 5 from the host and transmitting the control signal to the host;
- a web server part for programming and storing the received image data, sound data and sensing data and reading out the stored control signal depending a request of the web client part; and
- a database for storing the image data, sound data, sensing data and the control
- 10 signal, the database being shared by the server network part and the web server part.

4. The system of claim 1, wherein said web client part is connected to the server part through a wireless Internet and has a built-in web browser using a WAP (Wireless application protocol)-based WML (Wireless markup language).

15

5. A remote control and monitoring method using the Internet, the method being applied to the system of claim 1 and comprising the steps of:
- setting a client homepage and a database record and determining whether or not a service is requested from the host part;
- 20 determining whether or not a flag of a database of the server part has a specific value if a service is requested from the host part;
- transmitting a service start signal to a host network part of the host part if the flag has the specific value;
- receiving the image data, sound data and sensing data from the host network part



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of the host part and recording the received data in a record of the database of the server part; displaying the homepage of the client depending on a request of the web client and displaying the stored image data, sound data and sensing data on the homepage; and

determining whether or not to initialize the flag of the database, if the flag is not  
5 initialized, repeating the recording, displaying and transmitting steps while if the flag is initialized, requesting an ending of the service.

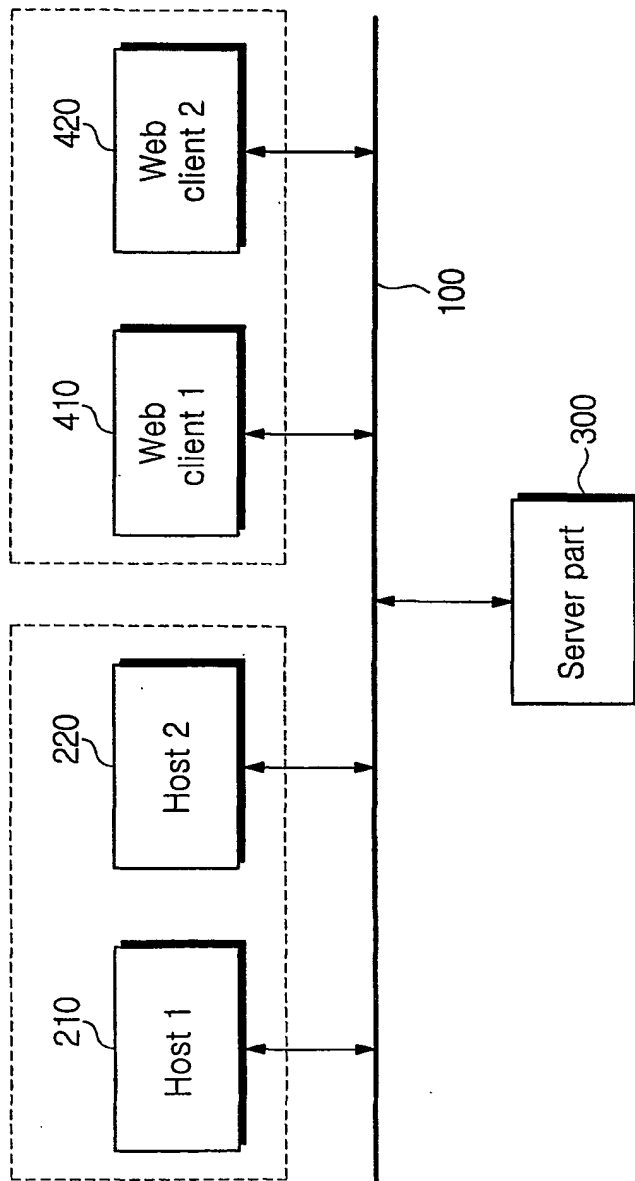
6. The method of claim 5, further comprising the step of reading out a corresponding control signal record from the database depending on a control signal of  
10 the web client part and transmitting a control command to the host part after displaying the stored image data, sound data and sensing data.

a homepage setting part which allows a homepage user to select the homepage from the homepage information DB.

15

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FIG. 1



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FIG. 2

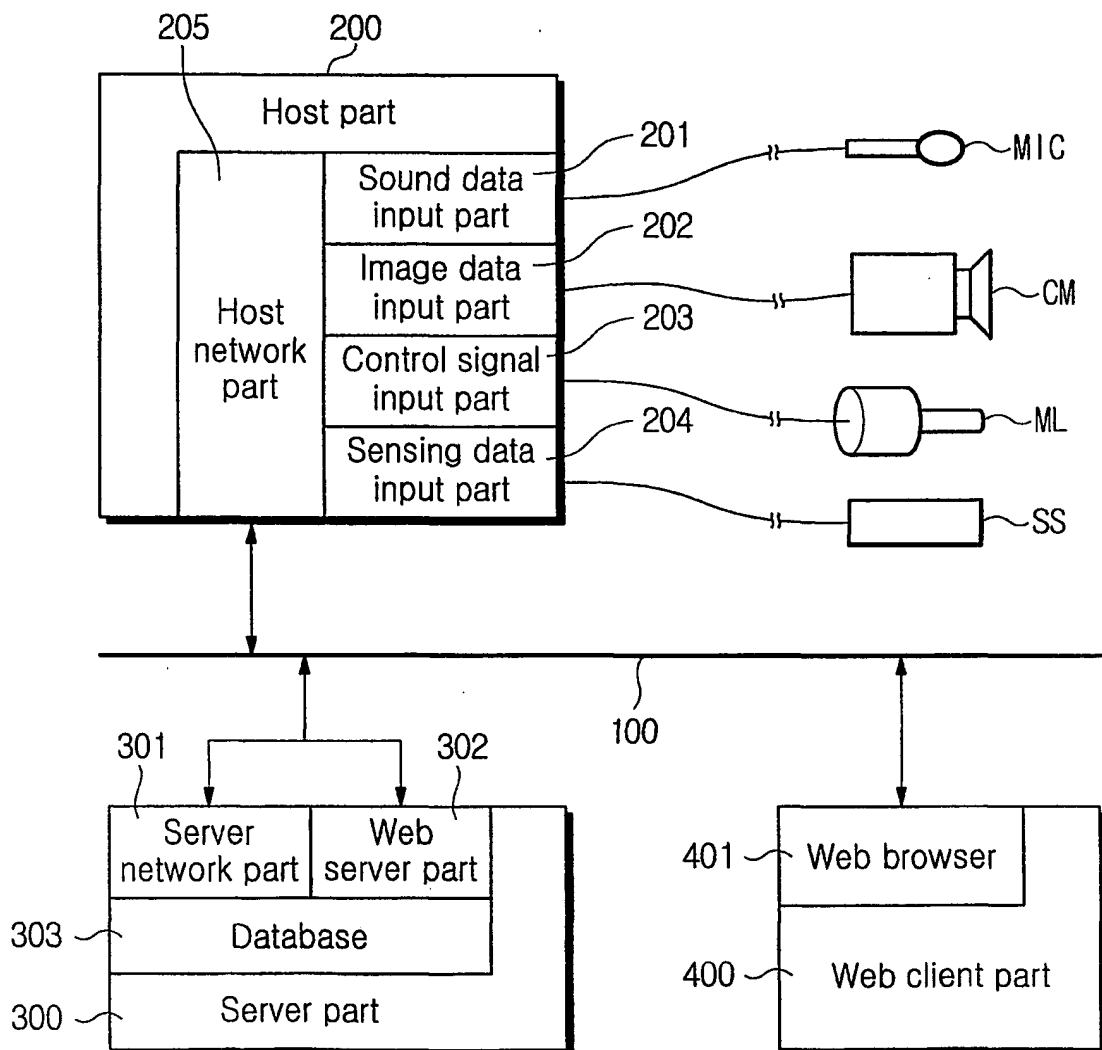
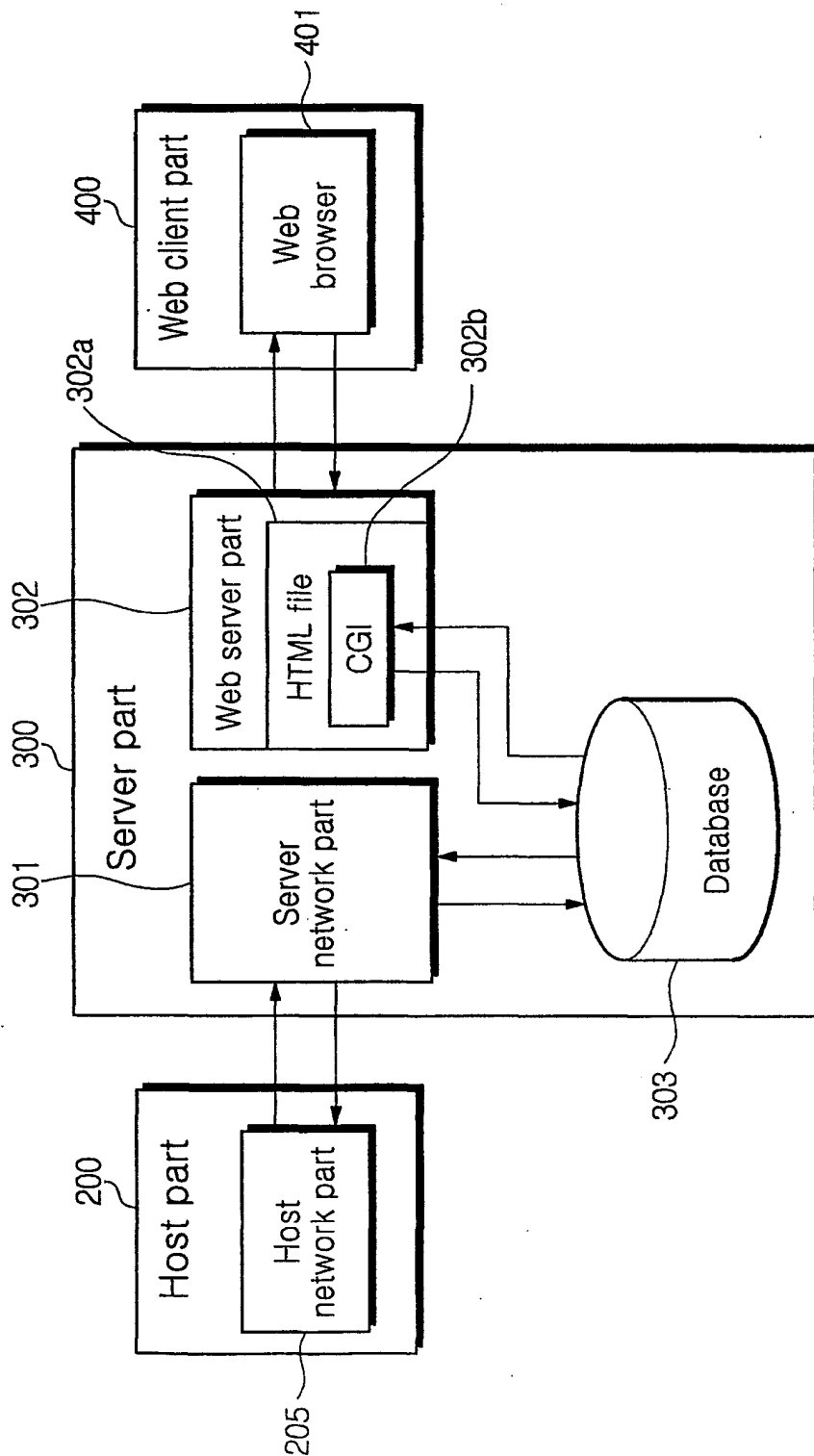
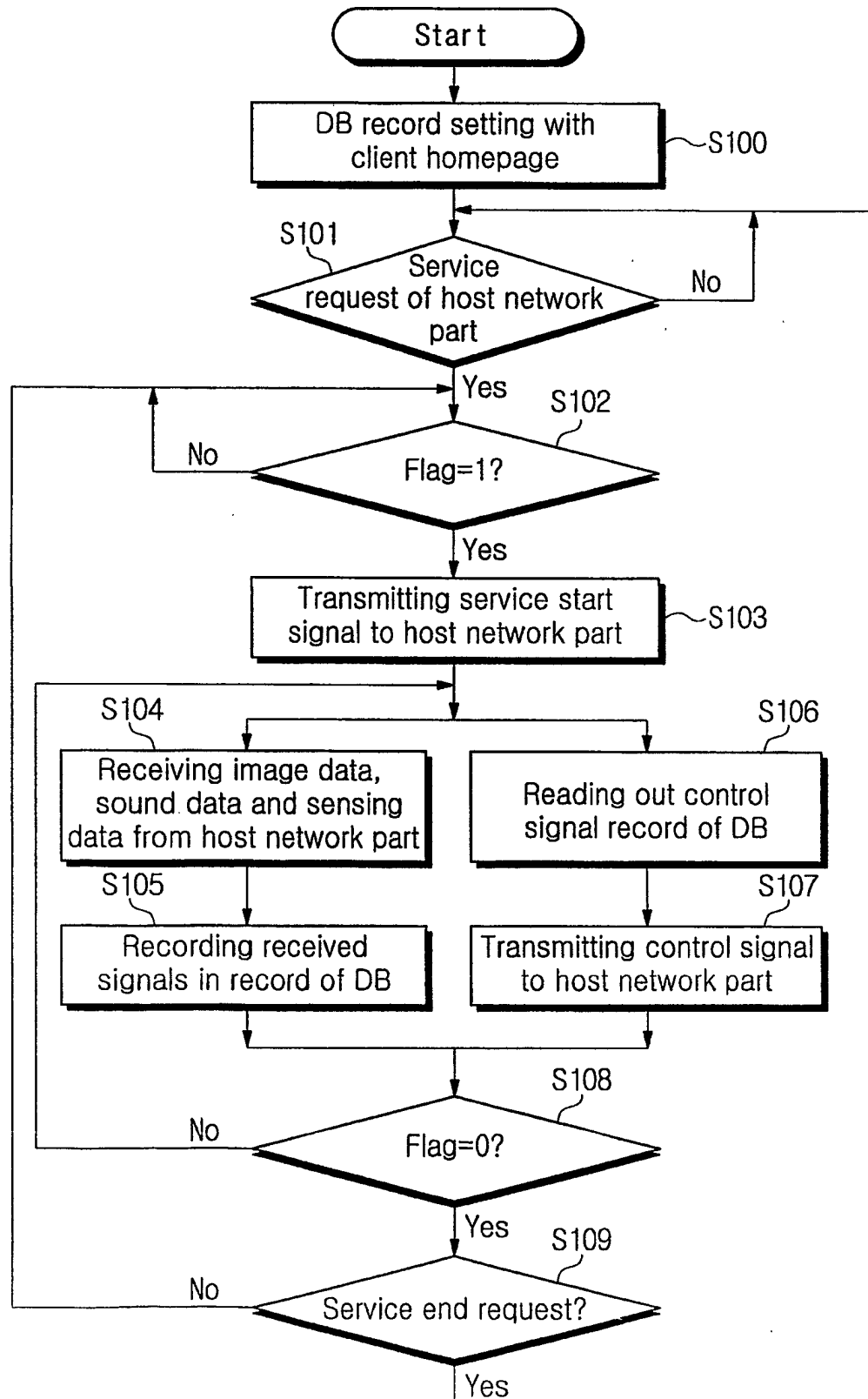


FIG. 3



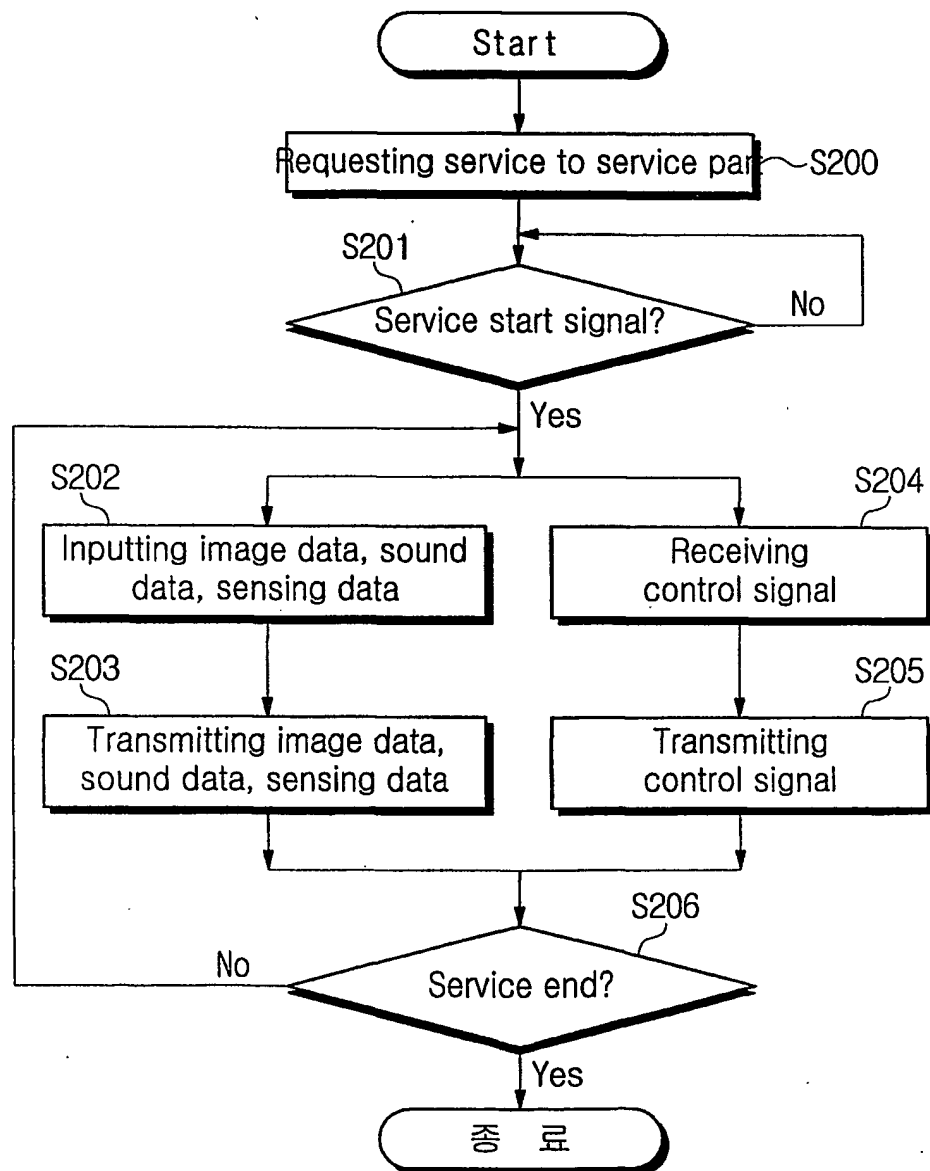
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FIG. 4



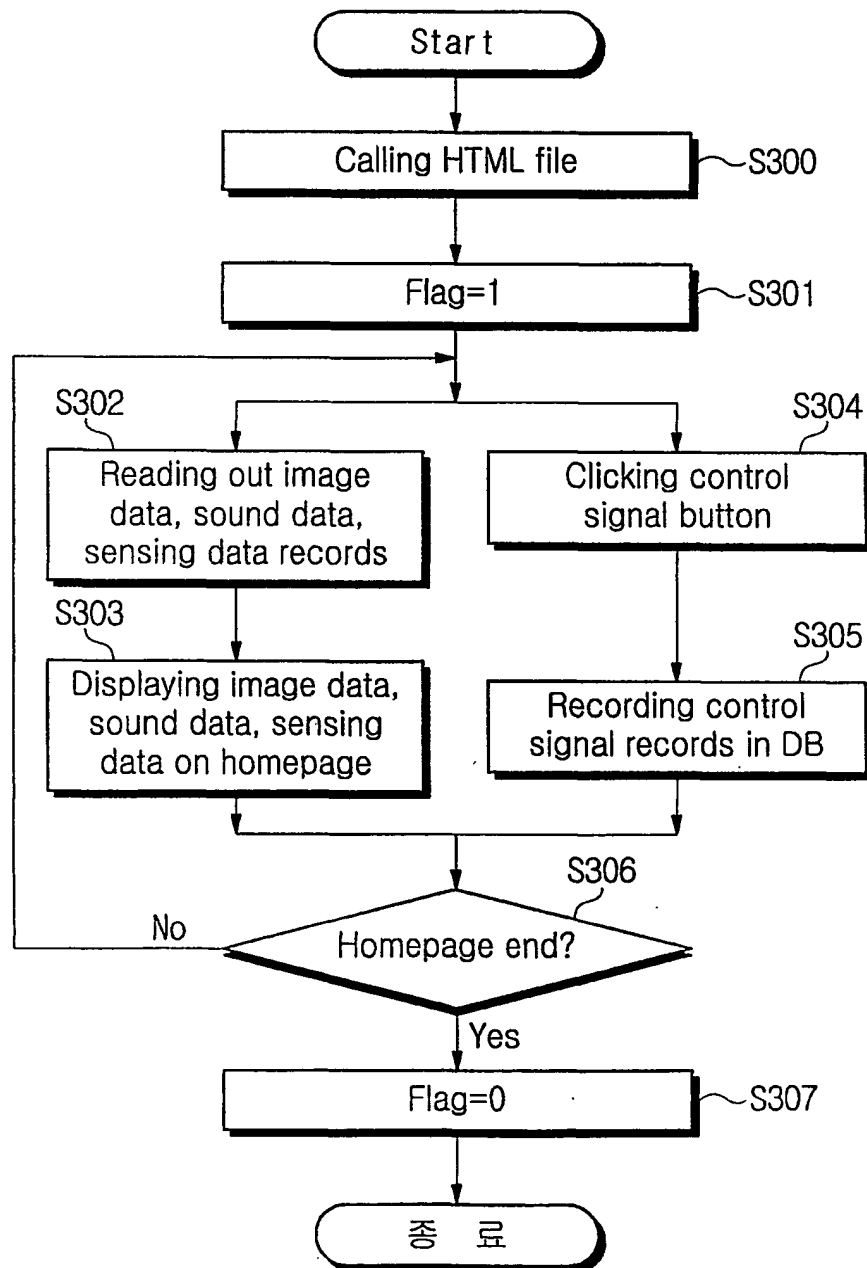
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FIG. 5



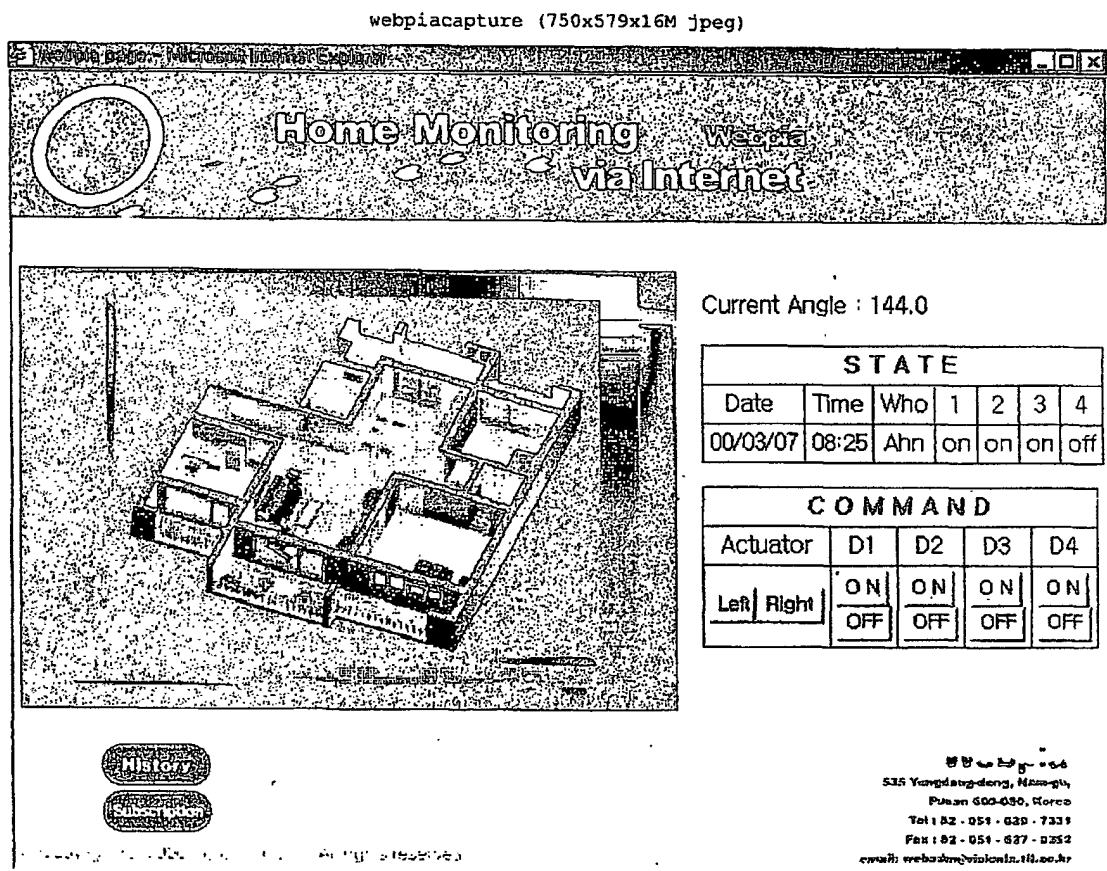
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FIG. 6



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FIG. 7



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## INTERNATIONAL SEARCH REPORT

international application No.

PCT/KR01/00629

**A. CLASSIFICATION OF SUBJECT MATTER****IPC7 H04L 12/24, H04L 12/26, G06F 17/60**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC7 H04L 12/24, H04L 12/26, G06F 17/60

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KOREAN PATENTS AND APPLICATIONS FOR INVENTIONS SINCE 1975

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Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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Date of the actual completion of the international search

31 JULY 2001 (31.07.2001)

Date of mailing of the international search report

31 JULY 2001 (31.07.2001)

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Information on patent family members

International application No.

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